

Evaluating Primary Dendrite Trunk Diameters in Directionally Solidified Al – Si Alloys

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The primary dendrite trunk diameters of Al-Si alloys that were directionally solidified over a range of processing conditions have been measured. These data are analyzed with a model based primarily on an assessment of secondary dendrite arm dissolution in the mushy zone. Good fit with the experimental data is seen and it is suggested that the primary dendrite trunk diameter is a useful metric that correlates well with the actual solidification processing parameters. These results are placed in context with the limited results from the aluminium - 7 wt. % silicon samples directionally solidified aboard the International Space Station as part of the MICAST project.